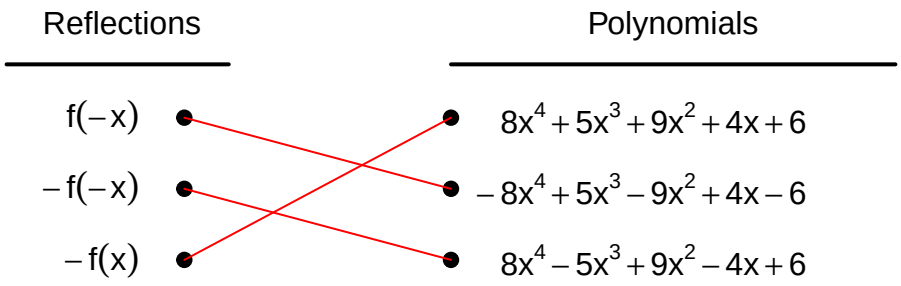
Name: Date:

Exam: Function Reflections (Solution version 611)

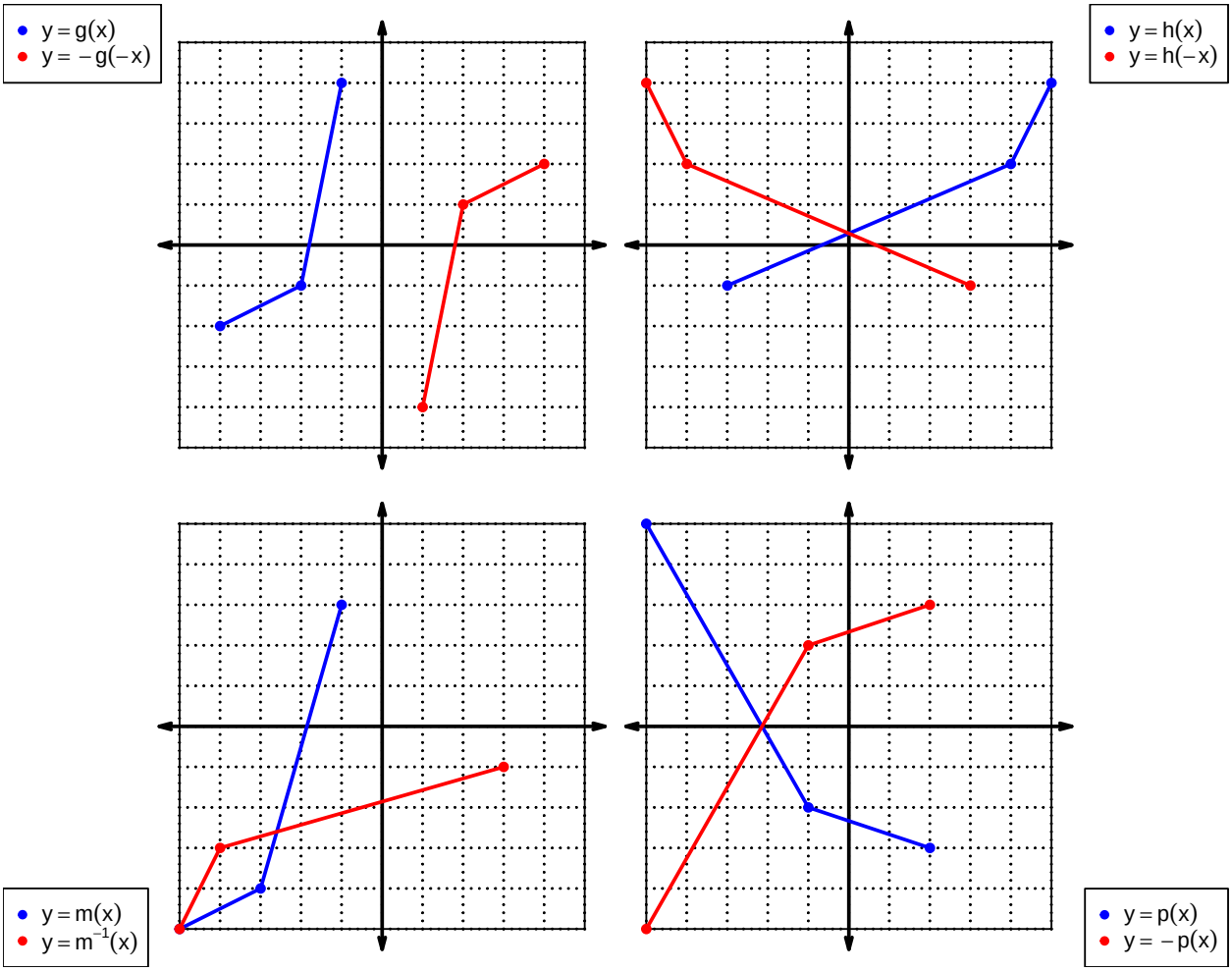
1. (worth 9 points) Let function f be defined by the polynomial below:

$$f(x) = -8x^4 - 5x^3 - 9x^2 - 4x - 6$$

Draw lines that match each function reflection with its polynomial:



2. (worth 20 points) In each xy plane shown below, a function is graphed with blue. Draw the indicated reflections (as a second curve, indicated in legend) with black (or with whatever you have). The x axis is horizontal and the y axis is vertical (as typical), and the scale is equal on both axes.



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For all questions on this page, the functions f, g, and h are defined by the table below.

x	$f(x)$	$g(x)$	$h(x)$
1	3	2	1
2	6	3	4
3	7	4	6
4	8	9	7
5	1	8	3
6	4	1	8
7	2	5	5
8	9	7	9
9	5	6	2

3. (worth 3 points) Evaluate $f(9)$.

$$f(9) = 5$$

4. (worth 3 points) Evaluate $h^{-1}(8)$.

$$h^{-1}(8) = 6$$

5. (worth 3 points) Assuming f is an **even** function, evaluate $f(-2)$.

If function f is even, then

$$f(-2) = 6$$

6. (worth 3 points) Assuming g is an **odd** function, evaluate $g(-4)$.

If function g is odd, then

$$g(-4) = -9$$

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7. (worth 15 points) A function, f, is **even** if $f(x) = f(-x)$ for all x in the domain. A function, g, is **odd** if $g(x) = -g(-x)$ for all x in the domain.
Let polynomial p be defined with the following equation:

$$p(x) = -x^2 - x$$

a. Express $p(-x)$ as a polynomial in standard form.

$$p(-x) = -(-x)^2 - (-x)$$
$$p(-x) = -x^2 + x$$

b. Express $-p(-x)$ as a polynomial in standard form.

$$-p(-x) = -\left(-x^2 + x\right)$$
$$-p(-x) = x^2 - x$$

c. Is polynomial p even, odd, or neither?

neither

d. Explain how you know the answer to part c.

We see that $p(x)$ is not equivalent to either $p(-x)$ or $-p(-x)$, so p is neither even nor odd.

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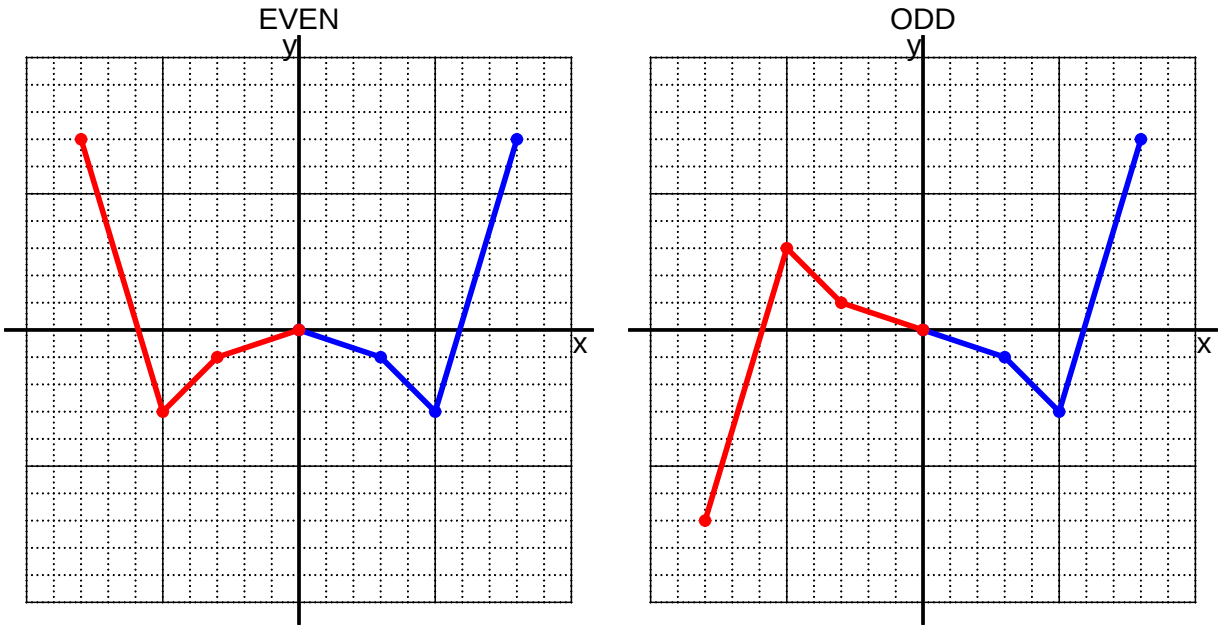
8. (worth 10 points) I have drawn half of a function. Draw the other half to make it even or odd.



9. (worth 10 points) Let function f be defined with the equation below.

$$f(x) = 2x - 8$$

a. Evaluate $f(51)$.

step 1: multiply by 2
step 2: subtract 8

$$f(51) = 2(51) - 8$$
$$f(51) = 94$$

b. Evaluate $f^{-1}(12)$.

step 1: add 8
step 2: divide by 2

$$f^{-1}(x) = \frac{x+8}{2}$$
$$f^{-1}(12) = \frac{(12)+8}{2}$$
$$f^{-1}(12) = 10$$

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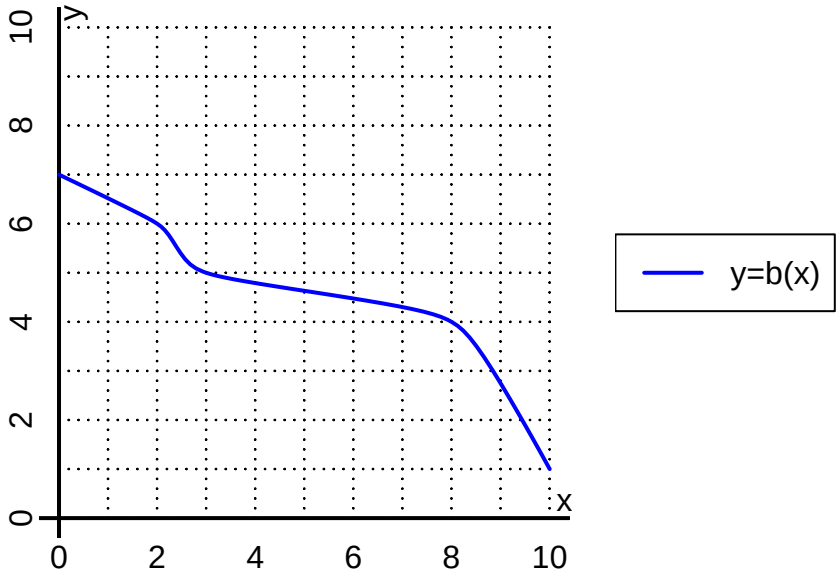
10. (worth 6 points) The function b is represented by the curve $y = b(x)$ graphed below.



a. Evaluate $b(2)$.

$b(2) = 6$

b. Evaluate $b^{-1}(5)$.

$b^{-1}(5) = 3$

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11. (worth 18 points) Function f is defined by the table below.

    a. Complete the columns for $-f(x)$ and $f(-x)$ and $-f(-x)$.

x	$f(x)$	$-f(x)$	$f(-x)$	$-f(-x)$
-2	3	-3	3	-3
-1	-5	5	-5	5
0	0	0	0	0
1	-5	5	-5	5
2	3	-3	3	-3

b. Is function f even, odd, or neither?

even

c. How do you know the answer to part b?

Function f is even because column $f(-x)$ matches column $f(x)$ exactly.